H136 Transformation by Fire: Posthumous Treatment and Biological Profile Reconstruction of Cremated Human Remains

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After attending this presentation, attendees will have a better understanding of: (1) variability in posthumous treatment and thermal alteration of highly fragmented and burned human bodies; and, (2) methods and protocols inspired by the study of modern and ancient cremations for the purpose of reconstructing biological profiles and postmortem treatments.

This presentation will impact the forensic science community by demonstrating the importance of an integrated approach to analyzing highly fragmented and burned human remains to obtain a positive identification, reconstruct postmortem events of legal importance, and conduct a successful deposition.

Anthropological analysis of highly fragmented and burned human remains is of great importance. Remains in these conditions are often produced in cases of mass fatalities, such as terrorist activities, and airplane crashes, among others. Individual cases of highly burned human remains involving accidental and/or intentional fires also occasionally arrive at Medical Examiner Offices, requiring anthropological consideration. The type and degree of thermal alterations can be unique to particular cases but present some commonalities depending on the duration and exposure of the body to the fire. Nonetheless, on most occasions these types of cases are fairly complex due to the high degree of fragmentation and destruction of the body. Using an approach integrating study of the recovery scene, reconstruction of biological profile, and examination of thermal alteration and body manipulation can advance reconstruction of events, identification processes, and successful deposition. This study is informed by analytical methods developed through work with both modern and ancient cases of cremated bodies. This presentation, we illustrate this approach with two case studies from the Sonoran Desert of southern Arizona that present somewhat similar postmortem treatments. The first step of the analysis was a detailed skeletal inventory of each individual. These analyses allow for interpretations of body completeness and the minimum number of individuals represented in each deposit. Following this inventory a biological profile was produced in which age-at-death, sex, pathological conditions, degenerative joint disease, and trauma were assessed. Thermal alterations and posthumous treatment of the bodies were documented in detail. In this research, bone color, bone weight, type and degree of fractures cause by fire, maximum length (mm), average length (mm), and quantification of bone fragments ≥2mm in length for the cranial, dental, axial, upper appendicular, and lower appendicular anatomical regions were recorded. Analysis of the case deposits included a detailed reconstruction of the disposal area to distinguish between potential post-depositional disturbances, such as natural processes, soil condition (e.g., pH), and bioturbation, from intentional practices. Case A presents the analysis of two victims. These two victims were murdered and their bodies were thoroughly burned for several days in four different trash pits. Osteological analysis revealed the presence of approximately 3,210 countable, and many smaller, burned human bone fragments of different sizes from two adult individuals. The remains were differentially exposed to fire and highly fragmented. Morphological landmarks and differential thermal alterations on the human remains allowed for refitting of several bone elements, evaluation of differential exposure of the remains in the fire, and to reconstructing posthumous treatment of the individuals. Biological profiles allowed circumstantial identification of the two victims, and ultimately DNA analysis comparisons allowed that one individual could be positively identified. The case was successfully presented in court and a sentence was delivered to the defendant. Case B is an individual from the Prehispanic Hohokam culture (Preclassic Period, A.D. 700-1150), also from the Sonoran Desert of southern Arizona. In this case, the remains were highly burned and fragmented in a cremation funeral ritual and later the body of the deceased was divided and placed into at least two separate pits in the ground. Although this Hohokam individual was burned as part of funeral customs, the body presented similar thermal alterations, degree of fragmentation, and posthumous treatment as the individuals in Case A. Using the treatment of both modern and ancient cremated remains as case studies, this presentation seeks to demonstrate the potential advantages in the integration of forensic and bioarchaeological investigations to contemporary death investigation.

Cremation, Postmortem Treatments, Biological Profile

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